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# METHODS IN GEOGRAPHY.

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BY

LURA L. PERRINE, A. B.,

INSTRUCTOR IN GEOGRAPHY AND GEOLOGY, STATE NORMAL SCHOOL,

VALLEY CITY, N. D.

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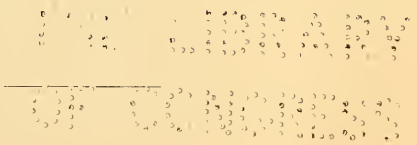

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# Methods in Geography.

## 1. DEFINITION.

GEOGRAPHY (Gr, γέα, γῆ, the earth and γραφή a description, derived from γράφειν to write). Therefore the root meaning of Geography is a description of the earth.

"Geography treats of the earth as the home of man".—*Alex Frye.*

"Geography is a practical study of man's habitat and its relation to him" —*Report of Committee of Fifteen, p. 26.*

"Geography is a part of our every-day life, not a mere learning of places, but a living reality".—*Dr. Spencer Trotter.*

"Geography may be held to be the description of the earth in relation to man, in all the bearings of that relationship".—*Dr. Hugh Robert Mills, of London, F. R. G. S.*

"Geography is a univeral study, a band that binds many other studies into a living whole. It is the central study to which other studies must necessarily gravitate, because it is the study of the earth, and the earth is the theater of all human thought and action".—*Dr. S. Trotter.*

"Geography is difficult to define on account of its intimate relations and intergradations with geology, meteorology, zoology, botany, history, politics, etc., It is difficult therefore to name the limit in dealing with these sciences in geography".—*Report of Committee of Ten.*

## 2. SCOPE.

"Geography is not a simple science, but a collection of sciences, levied upon to describe the earth as the dwelling place of man, and to explain something of its more prominent features". "About one-fourth of this material relates to geography strictly; about one-half to the inhabitants, their manners, customs, institutions, industries, productions, and the remaining one-fourth to

items drawn from the sciences of minerology, meteorology, botany, zoology and astronomy".—*Com. of Fifteen, p. 26.*

Geography does not attempt detailed investigations, but it accepts from the sciences those facts determined by them that bear upon the well-being of man or that enable us to comprehend the general plan of the marvellous creation, wherein we form a part.

Next to the history and experience of man himself the study of the globe gives the most "profound and perennial a human interest".—*Opinion of Archibald Geikie.*

The geography of fifty years ago emphasized location of cities, capes, boundary lines, etc., and an abundance of map questions. Dead knowledge.

The later geography gave vivid descriptions, abundant pictures, a clearer knowledge, and a greater interest; it was illustrative of facts but not stimulative of thought. Often a short-lived possession.

The new geography emphasizes the causal notion, gives the means of explanation of facts generally to be learned; it gives a basis for thotful study. A living growing knowledge, a lasting possession.

The second surpasses the old, because it gives an accumulation of geographical facts in a much better way, But both fail to give true geographic insight and power. The causal notion must play an important part where ever the teaching of geography is to be stimulative of thot to any high degree.

## 3. PLACE IN EDUCATION.

Two principles or purposes determine the adoption of each branch of study into the school curriculum. Each individual study is chosen because: first, it gives the pupil the ability to understand his habitat and this leads to his mastery of the things and forces of his environment; second, it develops some faculty or power in the pupil and this training of the intellect, feeling or will, this exercise of memory, imagination, judgment or the heart gives the child a fuller possession of himself and so enables him not only to render more valuable service to others, but to receive larger and better returns of service from others.

These two principles are not antagonistic, but agree in giving to the pupil increased powers of mastery and this tends continually toward a richer and more complete life.

In this equipment of the individual for the most successful living, Dr. W. T. Harris, U. S. Commissioner of Education, places the study of geography second only to the study of literature in importance. To realize something of the worth of geographical study one needs only to consider the range of useful fundamental ideas obtained by the pupil thru this study in early life, and the inconveniences that would ensue to each individual should geography be banished from our curriculum.

In his able article, "The Place of Geography in the Elementary Schools", published in the Forum for January 1902, Dr. Harris says, "For practical thinking the generalities of geography are exceedingly important", "more important than any specific notions that follow later". Here he refers to such general notions as the form and motions of the earth, relations in latitude and longitude, and fundamental ideas pertaining to relief, climate, life, etc.

The simple idea of a round world revolving about another body brings to the pupil's mind "a correction of mere sensuous observation by an abstract and deeply scientific train of thot". When once these ideas of planetary form and motions are fully grasped, there is started a wonderful system of inferences, which must extend thruout the life of the individual. With the study of the relative positions of the continents and countries must be acquired much of history; from the study of the formation and modifications of physical features must arise some realizations of the important work of many apparently insignificant natural forces. From the study of climate there follows the variety and distribution of plant and animal life and the desirability of an interchange of products. The study of man and his industries serves as an introduction to the elements of anthropology and sociology, for in man's foods, abodes and dress, his customs, occupations, governments and religions lies the record of his progress from individual slavery toward freedom. Civilization and commerce go hand in hand and Dr. Harris says "There is certainly nothing of more importance that the school gives the child—next to literature with its revelation of the feelings and thots of his fellows—than this matter of the division of labor and the need ot each population on the face of the earth for the other populations, who contribute to it certain necessaries of life. Is there anything more productive of kindly and hopeful feelings toward one's fellowmen, living under different governments and separated by vast distances than this study which finds each useful to the industrial whole?"

Elementary education has always included some instruction in geography. In the middle ages geography was known as "geometry" and thruout this period history was not separated from geography.—*Com. of Fifteen, p. 26.*

"What educative value there is in geology, meteorology, zoology, botany, ethnology, economics, history, and politics is to be found in the more profound study of geography, and to a proportionate extent in the study of its merest elements".—*Com. of Fifteen, p. 28.*

The great educative value of geography is seen in the fact that "it makes possible something like accuracy in the picturing of different places and events, and removes a large tract of superstition from the mind". One's stock of geographical knowledge is constantly in requisition, if we form correct ideas from daily reading of newspapers. Neither newspapers nor books can aid much in the formation of an enlightened public opinion among a people lacking in a knowledge of geography".—*Com. of Fifteen, p. 28.*

The value of geography, as a study lies in its relations to other studies.

The Committee of Ten declare that physical geography should embrace the elements of at least one-half dozen natural sciences.

## 4. INTERRELATION OF NATURAL SCIENCES.

Geography was formerly regarded as a "root-science from which all others branched; now we prefer to view it as the focus at which all the physical and historical sciences converge to throw light upon the earth as an organic whole".—*Mill's Hints to Teachers, p. 8.*

The function of Physiography has a unique value in mental training, being at once an introduction to all the sciences and a summing up of their results. It enables a beginner to obtain a quicker insight into any of the special sciences and a fuller grasp of it, while at the same time a student versed in any one special science is enabled to appreciate far more fully than an unversed one its relation to all others, and to the universe.—*Dr. Mill's "Realm of Nature", p, 13.*

"Physics or Natural Philosophy in a sense includes every other branch of physical science, altho portions of biology and geography extend beyond its limits".—*Dr. Mill.*

According to Dr. Mill's idea the above sciences are not to be considered as blocks covering the whole field of nature, but rather as main lines of travel from the world's capital, whose branches interlace intricately everywhere thruout the whole domain of science.

The study of geography must thus increasingly demand a practical acquaintance with many sciences and modes of thot and expression, simply with an object of collecting their results and applying them to the clear understanding of the earth viewed as a suitable home for civilized man.—*Mill's Hints, p. 19.*

## 5. DIVISIONS OF GEOGRAPHY.

Dr. H. R. Mill declares (Hints p. 7.) that "Geography is one subject and to be effective must be treated as such. The attempt to read it apart into the isolated departments of mathematical, physical, political, historical, and commercial geography is thoroly unsatisfactory". To show the content of geography and the interrelation of its parts Dr. Mill uses the following pyramid: (Mill's Hints, p. 10.)

"Commercial motives consolidate national life, accentuate racial differences, redistribute animals and plants, modify physical conditions, start investigations into the nature of the earth, and even invade the solid groundwork of mathematics with the practical counsels of common sense".—*Mill's Hints, p. 16.*

The earth may be regarded as a great somewhat irregular solid mass, the geosphere, bounded by a stiffer outer crust, the lithosphere or rock-sphere; surrounded by a heavy liquid envelope, the hydrosphere; and this, in turn, is enveloped by a thin gaseous easily-disturbed atmosphere.

With this idea in mind, we find the following sub-divisions of geography given by Prof. C. W. Hall in his General Geology Syllabus, p. 6.

GEOGRAPHY.

- METEOROLOGY — The study of the atmosphere with considerations as to its past and future condition.
- OCEANOGRAPHY — The study of the hydrosphere, the liquid layer, resting in the hollows of the geosphere or solid earth. More broadly it also considers the waters in the reservoirs which supply the seas.
- PHYSIOGRAPHY — That study of the geosphere, which involves a rational investigation of the land areas of the globe.

## 6. ORDER OF GEOGRAPHIC SUBJECTS.

"The natural order of geographic subjects in the school curriculum seems, therefore, to be the following:

1. Elementary Geography, a broad treatment of the earth and its inhabitants and institutions, to be pursued in the primary, intermediate, and lower grammar grades.

2. Physical Geography, a more special but still broad treatment of the physical features of the earth, atmosphere and ocean, and of the forms of life and their physical relations, to be pursued by the later grammar grades.

3. Physiography, a more advanced treatment of our physical environment, in which the agencies and processes involved, the origin, development, and decadence of the forms presented, and the significance of the features of the earth's face are the leading themes, to be pursued in the later high school or early college years.

4. Meteorology, a specialized study of atmospheric phenomena, to be offered by schools, that are prepared to do so properly, as an elective in the later high school years.

5. Geology, a study of the earth's structure and its past history, to be

offered by schools prepared to do so properly, as an elective in the last year of the high school course.—*Com. of Ten, p. 209.*

Professor Edwin J. Houston, in a Minority Report favors the following order in the curriculum: (1) Elementary Geography which is an Elementary Physical Geography; (2) Descriptive Geography; (3) Mathematical Geography; (4) Political Geography; (5) Physical Geography (proper); and in this he favors the order of topics as given in the work of Professor Arnold Guyot.

Political Geography hinges directly upon Physical Geography and the two are essential elements in one great system.—*Opinion of Dr. S. Trotter.*

## 7. THE FACULTIES EMPLOYED IN GEOGRAPHY.

Among the many mental faculties exercised by this study the three most worthy of consideration, aside from those of memory and expression are, viz;

(1) The powers of observation.
(2) The powers of scientific imagination.
(3) The powers of reasoning.

"The cultivation of the powers of observation is necessary to clear, accurate, and realistic fundamental ideas and modes of thot". (Com. of Ten p. 215). Thus only can the scientific imagination from clear impressions of of things seen, construct clear images of the unseen and give to the mind a representation of the larger portion of geographical matter. "Both clearness of observation and strength of imagination are essential as a basis for safe reasoning".—*Com. of Ten p. 215.*

Dr. Geikie declares that geography offers a cure for what he considers "a radical defect in our educational method, namely: The want of any effective discipline in habits of observation".—*Teachings of Geography, p. VI.*

(Read Dr. Trotter's and Dr. Mill's statements.)

Alexander Winchell says, "Each one of the natural sciences elicits into activity sooner or later every power of the human mind, and thus confers a culture which is symmetrical and complete. No such statement can be made of the studies by tradition called humanistic".

Elementary physical geography dealing with the fundamental ideas derived from many natural sciences must contribute to this symmetrical mental culture, proportionately to the number and kind of faculties employed.

## 8. TREATMENT OF GEOGRAPHY IN RELATION TO MENTAL DISCIPLINE.

It is absolutely essential to the effective arrangement and conduct of the work that the teacher hold continually in mind the mental powers to be developed. The teacher must also hold clear and definite views of the cultural purposes of the entire work, to insure not only the proper treatment of

the subjects in geography, but a more ready obviating of the difficulties generally encountered by the students.

For the best training of the powers of observation, imagination and reasoning the Committee of Ten (p. 215) suggest the following topics as ready resources:

A. For the Cultivation of the Observational Powers.

(1) Study of surface forms, such as hills, valleys, plains, plateaus, streams, lakes, shores and all similar phenomena within the pupil's horizon. These may be approached as already indicated by observations on miniature forms of like nature, such as may be found in gutters, gullies, ravines, brooklets, ponds, bottoms, etc.

(2) Observations upon temperature and its relations to the direction of the sun's rays, the apparent motion of the heavenly bodies, as their circling around the poles, the rising and setting of some stars and not of others, the shifting north and south of the sun and moon, etc.

(3) Movements of the atmosphere and their effects, rain and its effects, snow and its effects, fogs, clouds, etc.

(4) Plant life aud its dependence upon heat, moisture, sunlight, etc., the influence of soil, slope, etc.

(5) Observations of a similar nature upon animal life.

(6) Observations upon man, in the family, in educational, church, social and business organizations, in city and town organizations; and so on up toward the larger human organizations and the forms of government. So also observations on city and town plats, with their street systems, railways, canals, harbors, their wards, school districts, etc.

B. Under Work involving the Culture of the Imagination Will Fall the Formation of Concepts of All the Larger Features of Geography, and of All Features Beyond the Range of Observations, as

(1) The river basins, the great relief systems, the continental divisions and subdivisions, the ocean bottoms, the distribution of land and water, and in a less pronounced way, the picturing of all geographical features not actually observed.

(2) Modifications of apparent motions due to imagined changes of position of the observer on the earth's surface, such as a position at the poles, at the equator, on different parallels, etc.

(3) Distribution of the meteorological agencies over the globe, as moisture, winds, climate, the mental picturing of the great wind movements, the cyclonic circulation, the zones, etc.

(4) Distribution of plant life, developed in the form of a mental picture in its relations to the earth's surface, to land and water, to altitude and climatic condition, as distinguished from a mere memorizing of the facts of distribution without such a pictorial conception.

(5) Distribution of animal life in like manner.

(6) Distribution of races of men, forms of governments, natural territory, etc.

C. The Foregoing Lists of Topics Furnish the Material for the Culture of the Reasoning Powers, If the Questions of Causes and Agencies Is Raised In Connection with Each Topic.

Why do the several features take the form they do? By what agencies were they caused and why did these agencies work in such ways? How did these forms originate? What are the causes of the wind, the clouds, the changes of the temperature? Why are plants and animals distributed as they are? Why are these cities located as they are? Why are these large, and these small? And so on, ad libitum.—*Com. of Ten, pp 215-116.*

The Committee of Ten do not advise any dissociation of the processes employed in the specific development of these great mental powers in actual practice, but they urge upon teachers the necessity ot clearly comprehending what topics are especially fitted to develop certain mental powers and that the aim shall constantly be the acquisition of increased mental power as well as the mastery of the subject matter.

## 9. THE ORDER OF TREATMENT.

"The education of every child is the history of the entire race" (*Dr. Trotter, p. 3*). In other words "The genesis of knowledge in the individual must follow the same course as the genesis of knowledge in the race".

"In each branch of instruction we should proceed from the empirical to the rational. Science is organized knowledge, and before knowledge can be organized, some of it must first be possessed. Every study, therefore, should have a purely experimental introduction".

Habits of observing, reflecting and recording should be acquired in early childhood, for all mental habits which the adult student will surely need begin to be formed in the child's mind before the age of fourteen.

The Committee of Ten advise that the systematic development of the three leading classes of mental faculties should largely control the arrangement of the work in geography. Their geographical scheme reduced to the briefest form is; "first, see; next, reproduce; then study the reproductions of others, and, mean while, ponder and reason on all".—*Com. of Ten, p. 211.*

The Conference of Geography were uniformly decided in the opinion that the subject should be treated in the same manner "for pupils who are going to college, for those who are going to a scientific school and for those who presumably are going to neither".—*Com. of Ten, p. 17.*

This order of treatment, based upon mental processes is a matter of highest importance to all:

1. Observational Geography. This should precede all other forms of

geographical study, for it prepares the way for them, since its object is: [1] to develop the power and habit of geographic observation; [2] to give pupils true and vivid basal ideas, and [3] to arouse the spirit of inquiry and a thirst for geographical knowledge. This work should begin with observation of those features lying nearest pupils, since they are within reach of their direct study and ready comprehension; in the country it will be natural features; in town, artificial features largely. It is better to ignore neither class of objects and to seek for *type ideas*, which characterize other localities, thus giving the power to the pupils of forming correct ideas of things yet unseen. Observe especially the agencies producing surface changes, as winds, rain, thawing, etc.

II. Representative Geography. After observation should come reproduction in form of descriptions, sketches, maps, models, etc. "The great end of education is *to create productive ability*. Every attempt to reproduce objects seen, by verbal description, by sketch or map, reacts upon the observational work, stimulating to a greater clearness and definiteness in reproduction, and a marked advance in mental power is made". Pupils are thus led to realize the meaning of various modes of expression and they gain in the power to read with ease and understanding the descriptions and maps that become later in the study the great medium of information.

"The power of understanding a map and getting from it all the information it can afford, is an acquisition which lies at the basis of all sound geographical progress".—*Archibald Geikie in Teachings of Geography, p. 10*. Dr. Geikie also declares that a large proportion of even the educated part of any community have only a limited and imperfect conception of the full meaning and uses of a map. He considers the ability to comprehend a map, to master a map, as necessary to any pupil for promotion.

III. Derivative or Descriptive Geography. The study not of the earth itself but of a description of the earth's surface. This must follow the gaining of true and vivid basal ideas by observation and the acquiring by reproduction of a realistic sense of the meaning of maps and the ability to read maps readily. We cannot travel far, hence we must depend upon the descriptions of others. While greatest attention may now be given to descriptive geography, the observational and reproductive work should be continued, making more complete and vivid the new ideas gained. It is a common mistake to neglect these.

IV. Rational Geography. The please of the subject that leads directly into the reasons of things is "the soul of the science". Pupils are to be taught to reason concerning phenomena, not to memorize a stated reason. The work must be adapted to the capacities of pupils. The introduction of the rational element, which gives life to all geography requires skill and discretion on the part of the teacher.

The relation of cause and effect is the fundamental law of nature; cause must be sought, effect is revealed everywhere. There is an adequate cause for everything as it exists to-day. The study of facts implies a search immedi-

ately for their meaning. The objection sometimes offered against this introduction of the causal notion, everywhere in the study, on the ground that it consumes time for children to reason, is about as sensible as an objection to the laying of foundations broad and deep and firm for towering ten story blocks in our cities. Let the search for the cause become habitual in the study, and the foundation is already laid not only for successful prosecution of geography and all the natural sciences, but for more rapid and effective work in every department of knowledge.

This order of treatment, if carefully and thoroly carried out, should give to the pupil power in the use of the scientific method. Compared to this the knowledge of so-called scientific facts is unimportant. There is no "I think" or "about" in scientific method. Only such expressions as "I know" "with probable error,' or "there is no information" are allowable. Speculation has its place, but is strictly quarantined from the realm of scientific facts. "The two guardians of thot in science are accuracy and definiteness". Accuracy is always to be striven for tho it can never be attained. Definiteness in thot and description does not imply perfect accuracy in observation. Clearness requires definitenees.

## 10. MORE IMMEDIATE OBJECTS IN THE TEACHING OF GEOGRAPHY.

Setting aside the great value of the study of geography as a means of securing effectual training of mental powers we primarily teach geography:

(1) To develop in a pupil's mind a concept corresponding to the earth's surface. If the earth were a perfect spheroid its description would be easy and localization difficult, almost impossible except by latitude and longitude. If it were chactic in its surface irregularities, description and localization would be alike difficult (vide Bad Lands). But the earth is arranged in great slopes, an organism not of life but for life. The result sought then is a clear concept of the outline, vertical and horizontal, of the continents.

(2) To give by this clear concept, a basis for an acquaintance with material nature, that shall aid in commercial and social relations with the rest of the world.

(3) To aid in the future acquisitions of such knowledge as shall enrich the mental possessions of the pupils, giving ever-new interest to life and unveiling continually a newer, fairer world.

"We must aim to give a certain amount of information, but we should aim above all to give ability to gather information; in other words, we should develop the knowledge of principles thru the knowledge of facts".—*R. E. Dodge in J. of S. G., Jan. '67.*

There are special functions of geography to increase our knowledge of the country in which we dwell, and to trace the analogies and contrasts among the aspects of nature in other lands. Geography compares the continents and

shows how their topography has affected the distribution and development of the human population. Geography linked with human history notes how largely topography has influenced political events, how it has directed the migrations of people, centrifugal and centripetal; stayed or guided conquests, moulded national character, or given coloring to national mythology and literature.

(4) To soften and restrain the harsh judgments of fellow beings dictated by absolute rules of human conduct; to teach mercy by a comprehension of the circumstances that tend to make men what they are. Geography gives the key to the degrading and elevating influences of structural and climatic environments, and its limitations also. Low and degraded human beings can be tolerated when we realized how they have been moulded according to great natural laws and without right human teaching. We reverence more those who by prolonged struggles have risen superior to their environments, whether physical, mental or moral.

(5) To teach, via history, a comprehension of human laws and achievements; to give higher ideals of right living; to bring to the pupil a love for the human race and an appreciation of one's proper value as a unit in the great mass of human beings.

(6) And to the true teacher, geography is one of the most effectual means of bringing to the individual soul of the pupil an appreciation of the universal and the eternal. It is the means of leading the soul of a child early into the blessed light of truth. It places in the hands of a child the simple key, which, while unlocking the treasure houses of the present, shall become by a series of transformations able to give access later to still more wonderful store houses, impenetrable to him, who in early life has not been taught to use the magic key. Geography is simply a stepping stone, comparatively useless as an end. It is a means by which a child is educated to become wide-awake, skilful, accurate, earnest, patient, sincere, loving and religious.

## 11. TIME.

The Committee of Ten says of the present assignment of time to geography in primary and secondary schools that it is their judgment that more time is not "given the study than it merits, but that either more should be accomplished or less time taken to attain it".

The Committee of Fifteen, whose task was the correlation of studies in elementary schools, recommended that geography begin with oral lessons in the second year. In the middle of the third year the study with a text-book should begin and be continued, five lessons weekly, to the seventh year. During the seventh and eighth years three lessons per week should be given They also recommend recitations of fifteen minutes in length in the first and second years; of twenty minutes in length in the third and fourth years; of

twenty-five minutes in the fifth and sixth years and of thirty minutes in the seventh and eighth years.—*Com. of Fifteen p. 66.*

This does not preclude oral lessons, conversational in form, being given during the first year to stimulate observation and to strengthen powers of verbal expression, at the very outset of school life.

## 12. PRESENTATION.

### A. Miscellaneous Aids.

Best authorities recommend that schools be supplied with the following aids to geography: (1) Large scale maps of their own district and state; (2) The best obtainable series of general maps, physical as well as political (if possible on a uniform scale); (3) Small globes (4 to 6 inch) for individual study; (4) Illustrations of various kinds in great quantities, including photographs and lantern slides, where possible; (5) A few models, preferably of the home district; if not, typical models of some interesting portion of the country; (6) Books of reference on history, travels, natural history, etc., for the use of pupils and teachers; (7) A selected series of topographical maps for school use. To these should be added a good tellurian, a large ordinary globe, preferably pendent, and a rather large blackboard globe for general work. These aids are to be acquired as time passes and expense will allow. To the above may be added colored chalks (for board use), scrapbooks containing articles descriptive of geographical subjects, newspaper clippings, railway folders and maps, collections of common rocks and minerals, selected preferably from the school district. Care should be taken that these rocks are illustrative of weathering processes and soil production, not misrepresentative specimens nor curiosities. Specimens to illustrate elementary geological and botanical facts, and to serve as a basis for reproduction work in primary grades should also be added.

Professor R. E. Dodge says that to know how to use a map or encyclopedia or a book of reference or of travel, is far more important than to know what city manufactures the most fish hooks in the United States or the list of capes along the Atlantic seaboard.

### B. Modeling and Drawing.

"Modeling and drawing together with other graphic methods of expression are fully recognized as indispensable means of aiding the imagination, intensifying thot and strengthening memory",—*Com. of Ten, p. 219.*

But these means must be subordinated to the study of geography itself. They fail to accomplish their end and positively harm the pupil, when they become imitations or copies of other charts and maps. "The only use of modeling and drawing is to build in the mind a picture or a concept of a country or a continent".—*Col. F. W. Parker.*

Col. Parker also says that "relief maps, profiles und pictures of relief

maps contain a great deal more of truth to the young learner than all other means combined" (p. 98). Flat political maps teach little more than truth concerning horizontal form. Therefore, to learn outlines use drawing; to study relief or surface forms, use modeling, whether in putty, papier-mache or in sand. With the sand model we may also well illustrate the action of forces upon surface, as the erosive power of water and wind upon mountain and plain, etc.

### I. MODELING.

Summary of the benefits of modeling. (For discussion see Frye's Geography, with Sand-Modeling).

1. "Modeling is the means of gaining concepts of form, thru the touch, or the muscular sense; and by the association of these concepts with the corresponding sight products of light and shade, to cultivate the acquired judgment of form by sight.

2. By securing attention to surrounding figures, it develops observation and memory of form.

3. It is the simplest and quickest means of leading pupils to acquire knowledge of geographical forms from nature.

4. Modeling the important features of the surrounding surface, lays the basis in a natural language for leading pupils to imagine the continents.

5. It is the most natural means of form examination, as ability to model quickly and accurately from memory, may be accepted as evidence of a clear understanding of terms and definitions.

Since the relief of the earth upon which all surface conditions depend, is but an aggregation of slopes of different lengths and degrees the following thots on the uses of slopes from Col. Parker's "How to Study Geography" will be helpful:

1. The character of the joined slopes is the basis for the remembrance of all that has taken place on the land.

2. The inclined surfaces distribute the soil, physical forces crack off, break, abrade, and grind up the solid rock. Under the law of gravitation, the sloping land distributes over its surface the ground up masses of soil. The upper parts of the slopes are the store-houses of soil-material for all the surface below.

3. The amount of rainfall depends largely upon the height and arrangement of slopes.

4. The distribution of heat is modified by height.

5. Drainage depends entirely upon the arrangement of land surfaces in slopes. Water percolating thru soil down inclined surfaces gives rise to vegetation, and upon vegetable life animal life depends.

6. The upraised masses of land determine the coast line.

The surface of the whole earth is arranged in slopes as an organism, not of life but for life.

Since the surface of the earth is made up of slopes, the only way to

obtain a concept of the surface is by the study of (1) the surrounding surfaces; (2) the relief maps, both molded and printed. Hence practice in modeling maps in sand is especially important, and this work should be supplemented by clear verbal description.

SUGGESTIONS.

1. The real object or a correct model should always be near by for comparison until the pupil has formed a clear concept of the subject to be modeled.

2. Lay aside the sand-modeling as soon as the pupil is able to imagine without its aid.

3. It is important that the sand table be so constructed that its tray-top can stand inclined or horizontal. This table should be made of pine or some light-weight wood, well seasoned to prevent warping; it should stand about 32 inches in height and have its tray-top attached to the ordinary top by hinges. This tray may be 3x4 feet in area and rimmed by 2 inch wood, lined by galvanized iron, preferably, so that the action of water on coast forms may be illustrated. A zinc-lined drawer under the top may hold the sand not in use. The sand should always be damp when in use,

II. DRAWING.

Teachers should use freely crayon and blackboard. The simplest illustrations may be most helpful; elaborate drawings are out of place. Col. Parker calls drawing the teacher's "second right arm" and urges teachers who draw poorly to "draw and keep on drawing" till the acquired skill shall become powerful in its good influence over the mental processes of their pupils. A part of the wonderful power of Agassiz and Morse lay in their marvelous skill in illustrating their lessons.

Encourage pupils to draw constantly, to endeavor to represent even imperfectly any object in sight or thot. The value of construction lines is very seriously questioned. The mental product is far better without them and the gaining of mental power is our first consideration. Therefore encourage free-hand drawing, first on blackboard, then on paper.

Aim first for general form (implying approximate relative dimensions).

Train the eye to measure distances.

Use simplest construction lines at first, if it is necessary, but discard them at earliest moment possible for the eye should be trained to grasp space relation quickly.

Use the scale constantly in testing work, to assist the eye and to train the mind to be satisfied with nothing but accuracy.

The first maps should be simple distribution maps, of mountains, of lowland drainage, of vegetation, of animals, of man, occupations, pasture lands, forests, etc. Political maps should appear much later.

Map drawing appeals to the eye and hand and educates thot and expression in the explanation; it serves often as a review, blending the old with

the new. Ability to produce good maps shows real progress. Pupils must learn to make good maps before they copy them: to feel a need for an understanding of each symbol before they use it; then the children's objections to map drawing will vanish.

### C. Text-books.

Text-books are needed (1) to furnish maps and other material; (2) to secure conciseness of definition; (3) to save time in study.

A departure from the text-book in classes is apt to lead (1) to a consuming of undue time in giving pupils what text-books give in much better form; (2) to a dwelling upon trivialities; (3) to a development of non-essentials; or (4) to simple entertainment—faults to be shunned persistently.

The textbook is to be an aid, not a master. In most grades, textbooks are indispensible to the acquisition of precision of understanding and of statement on the part of the pupils.

Make constant the practice of locating upon maps the places mentioned in history, travels, dailies and conversation.

Geographical readers, if rightly used, become a wonderful stimulus to further progress.

No text-book is perfect, but each new one is a help to the writer of the next one to come. Pupils may help to make their text-book better, when they realize that its scope is very limited at best.

### D. Field-work.

It is absolutely necessary to the gaining of clear geographical concepts that field-work be undertaken; we must observe for ourselves the actions of agencies that are ever shaping and reshaping the earth's surface. From the study of the simplest of our tiny spring streams from the bluff, the transition to and the understanding of the work of the mighty Father-of-waters, from Itaska to the Gulf, is very easy and the possession of such a river type is invaluable.

The disadvantages and dangers attendant upon field-work tho many, can be avoided by the skillful and thotful teacher and a definite real growth will be noted among the pupils, both in observational and reflective powers, and in a knowledge of the essential elements of topography. An increase of love for nature follows.

The Committee of Ten recommend, at least one-half day per week for out-of-doors instruction in geography, botany, zoology and geology; also laboratory practice on Saturday morning for at least one and one-half hours ("the shortest advantageous period").—*Com. of Ten, p. 50.*

In Germany the early work both in nature study and in geography is largely done out-of-doors. This is followed by sketching, drawing, verbal and written descriptions for in-door exercises. These excursions are fortnightly in some schools and home geography is taught twice a week based upon the out-door observations and drawings.

We must all be taught to see. Pupils can be aided by having their attention called to objects observed enroute to and from school; to the relative sizes, heights and positions of objects. When undertaken earnestly and pursued faithfully and intelligently, out-door exercises may become more useful and important than in-door exercises in geography, especially in the lower grades.

## 13. METHODS IN RECITATION ROOM.

The most suitable time for the presentation of new ideas to the pupil is generally found in the recitation.

"In no field of knowledge can anything new be appropriated unless there are found in the mind of the child well-grounded related thots".—*Lange's Apperception, p. 210.*

These mental possessions Lange terms apperceptive ideas and by apperception he means a complete assimulation of the new culture-material brought before the child. Apperception then is more than perception. In every act of apperception there is an apprehension of outer impressions modified by all the previously acquired knowledge of the individual.

It is a commonly accepted fact that every individual perceives most in the field with which he is best acquainted for in each act of perception he has been aided by his stock of related ideas, since they are the means by which he is enabled to grasp the new idea in its right relation and make it his own. There must be as many different ideas of one and the same object as there are observers for each has added his new perception to a varied stock of more or less related ideas and it has been strongly, faintly or not at all apperceived, depending entirely upon the wealth or poverty of the apperceiving mind.

The maxim "Provide for easy and thoro apperception" expresses more clearly a cardinal truth in pedagogy than do such watch words as "Proceed from the known to the unknown" "from the near to the remote", from the easy to the difficult"—sayings often misunderstood because they have only relative value.

"For the strong apperceiving concepts of the child are solely and alone the known to which the unknown is to be united, the near with reference to the remote, the easy leading up to the more difficult. Whatever does not belong to these aids to apperception remains strange to the pupil, no matter how near it may be to him in time and space, or how simple and easy it may seem; it cannot, in any way promote the appropriation of the new".—*Lange's Apperception, p. 241.*

To insure then this quick and clear apperception of the new by the pupil in the recitation pedagogical writers declare that five formal steps must be regarded by the teacher.

These are called, according to Lange:

1. Preparation (Analysis) } calling for careful observation.
2. Presentation (Synthesis) }
3. Combination (Association) } Proper Combination.
4. Recapitulation, including Abstraction (System) }
5. Application (Drill) Practical realization of the result of the lesson. Use of universal concepts just gained. (See Lange's Apperception, p. 200 et seq.)

In each recitation we must cling to this order of progress "From observation to thot, from thot to application". In the step called Preparation we review only those ideas already possessed by the pupil, which are included in the new material to be presented later. This is done not only to insure the right frame of mind, in which apperceptive ideas will be ready for instant action, but to strengthen the weak apperceptive ideas, if such exist, and in some cases to supply the necessary ideas for the coming lesson.

In Presentation the new ideas, one by one, are presented slowly, clearly and strongly to the alert mind.

In Combination the new is linked with the old in many ways, until their close relationship is grasped by the pupil.

Under Recapitulation comes the review of both the old and the new material which serves to bring out more clearly the relation of all the parts presented. From the consideration of this array of concrete facts there springs into being within the pupil's consciousness by a process of Abstraction a new concept, a general truth. This is primarily a definition-discovering process.

In Application (Drill) the new concept is tested, and fixed in the mind by the repeated application of the concept to the concrete. This application of universal concepts does not often come of itself, it must be taught and practiced until the pupil can use his knowledge authoritatively. Lange, in speaking of the importance of this drill in use of universal concepts, says "It must enable the pupil by many practical examples to discover the universal in the concrete material of all branches of knowledge, to comprehend it from every stand point". * * * It must cause him as often as possible to enter new fields of thot, thru concepts and rules already in his possession. It must lay before him numerous judicious problems for solution". This drill therefore must not be discontinued until the new concept has become a clear and strong mental possession of the pupil, a new apperceiving organ for future use. Mental wealth is measured by the number and importance of the available universal truths belonging to an individual.

The above five formal steps indicate the natural mental processes to be regarded only in the presentation of new culture-material in concrete form. When the lesson takes the form of review, examination or excursion, it is impossible to conform closely to this formal arrangement. When the new material is composed of well known elements, formal treatment is manifestly unnecessary. A historical narrative or a geography theme may add simply

new sense-perceptions to old concepts and so become confirmatory of previously acquired knowledge. And material, rich in concepts, like texts of scripture, sacred hymns, etc., suitable for teaching to the child, cannot be treated in the formal method, tho in later life the man may arrive at the real content of these by means of these very steps.

In summarizing Lange says, "When the teaching presents no new concrete culture-material for conscious appropriation, or when this material contains no new general elements, the formal steps cannot be followed. —*Lange's Apperception, p. 232.*

The teacher in geography, especially, must clearly understand the nature and purpose of each of these five steps in acquiring knowledge and strive for skill in their use, for again and again thruout the recitation this natural method must be followed whenever the new is to be brought forward.

It is necessary, then that the lesson plan be carefully prepared that the teacher may know the best order of topics to be pursued in conducting the class from the preparation to the application of the lesson, the legitimate time required for the mastery of the lesson, the difficulties that may arise before the pupils and the means of avoiding or meeting them.

The pupils range of thot and experience must be known, in order to secure in him the right mental attitude for the reception of the truths ot the lesson and, a little later in the recitation, the means of a more effective combination of the new material with his old ideas.

Proper emphasis must be given to the leading ideas presented to avoid confusion and to secure quickly a right appreciation of relation.

Time must be allowed, especially in the presentation, for the pupil to think and correlate the old and new before him.

He must be granted perfect freedom in his choice of the route by which he arrives at his abstraction.

The teacher must hold himself ready, if need be, to correct a false idea by a careful review or perhaps a more careful presentation, to strengthen the weak efforts put forth by the pupil by judicious questions (only after the pupils' recapitulation, however) by a review of the preceding steps, or by a continued drill in order to fix permanently in the mind what would otherwise become a weak and fading apperception. It is his business to secure as far as possible the full clear apperception of every truth presented which is within the capacity of the individual pupil.

Generalization must not be forced; it must spring from a fullness of concrete experiences. Therefore in the lower grades only three steps are taken with the pupils; preparation, including much observation, presentation and application. The teacher must help them thru the combination and abstraction required, Later they will learn to take each step in order under the guidance of the teacher, whose work is then still unfinished.

To render the pupil still stronger and more independent the teacher must, by a many-sided aud intimate connection of everything newly learned with other spheres of thot, strive for the formation of rich concept groups.

which from their very nature must form powerful organs of appreception.

"This aptitude of the concepts and general notions for apperception is the best gift that the school can confer on the pupil for the journey thru life." —*Lange, p. 244.*

## 14. OUTLINE OF A COURSE IN COMMON SCHOOL GEOGRAPHY.

First Year Primary Work.

Much may be done in this year introductory to the second year's work, which deals with the first acknowledged geography lessons. In the first of the primary years the instruction must be largely in elementary science. The work should be conversational in form, free from the slightest appearance of task-work and the spirit of quiet play should prevade the exercises wherever possible. The subject of the lesson may be something suggested by near objects, or a recent incident, for this rivets the attention—the falling rain, a stray feather, the flowers on the desk, a bit of bright ribbon, a pretty smooth stone all are full of interest to the child.

But no systematic treatment should be allowed. Arouse mental activities by skillful questions. Ask no questions that shall tempt a child to repeat hearsay. He must answer only that which he knows to be true. Throw yourself into the mood of the children and then question naturally.

Sum up the experience of the class and supplement this with natural related ideas to a very limited extent at first, to a somewhat greater extent later on.

Mutual sympathy between teacher and pupil is the basis upon which all good work rests in this as in all later work.

In the first year (and second as well) the pupils are occupied very largely with observation and expression, first oral, later written. Here lies the important task of forming right mental habits.

Home geography is the most appropriate and the only legitmate subject for this informal study. By means of local examples well studied, it will aid later the general geography in giving a reality and and a deeper meaning to all geographical facts and relationships. Foreign geography is understood in proportion, as we comprehend our own local one.

In the first year then, pupils should be taught:

1. Position. Let the pupil observe the position of single objects placed by the teacher; then let him place those objects in the same position; later let him observe the relative position of two objects placed by the teacher and after he has placed two objects let exercises with three objects, etc., follow. These operations should be followed by descriptions (oral of course), first of actions performed, and then of the relative position of objects. This may be made a fine preposition drill:

(*a*) first in describing various parts of the room or furniture with reference to themselves, then with regard to someone else, or some other object;

(*b*) by the use of right and left hands and later in the year by the use of cardinal points.

2. Directions—Cardinal points: Teach the pupil to find the north point by standing at noon facing his own shadow, with his right hand always toward the east, the left toward the west. The semi-cardinal points should not be developed until some time later, when the teacher should show that northeast is really in an easterly and a northerly direction at the same time, hence its name, etc.

3. Simplest observations on weather and seasonal changes.

4. Modeling, drawing, and painting of simple forms, as fruits, etc.

5. Plant life:

(*a*) Plant seeds in sand, loam, cotton and thick brown paper, all to be kept damp so that germination and growth may be observed. Incite pupils to a close watch of every change, observe vegetation changes out-of-doors.

(*b*) Encourage pupils to collect leaves, flowers, seed-vessels, seeds, moss, etc.—not a great number alike, but of as many kinds as possible. Study plants as a whole at first; later more carefully, the stems, leaves, bud-coverings, leaf-foldngs, etc.

6. Animal life:

(*a*) Confine work to live animals only, at first, dealing with habits, food, homes (dens or nests), coverings, (fur, feathers etc.), care of young, fitness for their life (teeth for guawing, swimming feet, etc., etc.)

(*b*) Collections of cocoons and chrysalides for observation of development.

N. B. Have no set form for the lessons. Do not determine that the pupils must observe certain things. Aid them to observe and then follow their observations. Let nature lead and discourage no attempts of the pupils, however crude. But encourage each to tell all his observations whenever possible.

## Second Year Primary.

This year's work, which is more distinctively geographical, should include:

1. A general review of the the first year's work in position, cardinal points, weather changes, plants and animals, where in each line may be extended somewhat. Verbal descriptions should be called for of objects modeled or drawn. Encourage the illustration of stories.

2. Then may follow lessons, informal still, on sky, horizon, zenith, vertical and horizontal lines.

3. Lessons, in modeling natural forms, as fruits, nuts, seed-vessels, animals, typical forms (as sphere, cylinder and cube). Let nothing pertain-

ing to mathematical geography be taught to a child of six or seven years. The molding of hills and valleys on the sand table may be allowed.

4. Develop the idea of a map, by molding a map of the school room, or by drawing on a large sheet of paper a plan of the school room. The pupils may prepare similar ones upon paper or slates. Encourage in every way the pupils to give directions concerning the placing of the representations of all objects upon this map. This is a valuable exercise in judgment-training as well as in observation and comparison, and should never be neglected in any grade work. Use blackboard freely in lessons on plants and animals.

5. Plants. Begin field lessons. Teach names of common trees and characteristic leaves and barks so that pupils may recognize each. Draw the the trees, leaves, etc. Plant gardens for flowers, vegetables, etc.

6. Animals. Observe birds, migration, nests, eggs, etc. Teach how the homes of animals are made. Lessons on forms, structure and use of animals. This may include some ideas of countries, where animals are found. Tell stories of animals, read stories of travel and of foreign countries to children. Use pictures largely.

### Third Year primary.

Review the work of the two lower grades, continuing the different lines of observation and study. Here history may be introduced by studying the homes, lives and habits of different people. (Read "Seven Little Sisters," published by Lee and Shephard, as a basis).

Field work is a most important factor in this year's training. With the simple basal ideas of hills and valleys already gained by molding in sand, it is now possible to enter more deeply into the various forms of hills, their causes and effects, etc, etc.

### I.

The following outline may serve as a suggestion in the development of lessons on hills.

1. Observe and describe.
2. Mold, first determining the scale.
3. Draw on blackboard and on paper.

Outline of points to be brought out in the development:

1. Hill.
   - (*a*) Forms of hills (first, special forms in home locality; later, general forms).
   - (*b*) Parts: top or summit; sides or slopes; bottom, foot or base.
   - (*c*) Material of which hills are made (rocks, sand, soil).
   - (*d*) How made? Cliffs or bluffs by stream erosion, rounded forms by rainfall, dunes by wind, etc.
   - (*e*) Uses of hills: condensers, reservoirs, drainage, protection, etc.
2. Chains of hills:
   - (*a*) Forms of; ridge, range, etc.

(*b*) Parts: (1) crest or comb; (2) passes; (3) slopes, terraces, hollows, valleys; (4) plateaus.

(*c*) Material: rocky layers, stones, sand, soil, etc.

(*d*) Causes of ranges: wrinkling, erosion, faulting, eruptions, etc.

(*e*) Uses, condensers, reservoirs, drainage fertilizers of valleys, moderators of temperature, wind-breaks.

3. The molding of a hill, a chain of hills, with the adjacent country,

4; Observation lessons on slopes, abrupt or gradual (how much and where?) Gulches, spurs and divides.

II.

This opens the way to the development of further lessons on: brooks, brook-basins, etc.

1. In these develop the ideas of:
   (*a*) Current, direction (down hill).
   (*b*) Up and down stream.
   (*c*) Banks, right and left.
   (*d*) Bed (always between two slopes).
   (*e*) Source (springs, etc.)
   (*f*) Mouth (outlet).
   (*g*) Tributaries (supply rivulets).
   (*h*) Basin, divides.
   (*k*) Enlargement; pond, lake with its inlets and outlets.
   (*l*) Change of level; waterfalls, rapids, swift currents.
2. Mold a brook basin.
3. Develop gradually the power of clear, accurate verbal expression:
   (*a*) What is meant by brook-basin, river-basin, ocean-basin?
   (*b*) What is meant by water-parting, divide?
   (*c*) What is meant by all terms employed in brook-basin?
   (*d*) What is meant by valley, plain, plateau?
4. By field-work, study the action of water on hills and slopes.
   (*a*) the washing down of soil, sand, pebbles, rock.
   (*b*) results: to hills, less high crests and less steep slopes; to valleys, deep soil at foot of cliff, enriched plains.
   (*c*) flood plains, deltas.

Later study the beds of streams, sandbars, gravel-shoals, pot-holes, effects of rocks in midchannel, of drift near shore, etc. Show how the silt is the real chisel in erosion rather than the water itself.

III.

Map of school-grounds.

IV.

Map of school-district (or of town) after conversations developing the natural features of surface, its bodies of water, etc. Follow this by carefully

written descriptions of district or town, as minute as the pupils are able to make.

Do not spend too much time mapping a large town, learning unimportant names of streets, etc. The chief good sought is the power to interpret maps. Teach pupils to estimate distances by pacing, etc.; to use a scale constantly in map construction.

V.

Conversation lessons on occupations: farming, lumbering, mining, quarrying, fishing, manufacturing, commerce, etc. Teach adaption of surface to occupation, river-basins and fertile plains to farming; hilly country to grazing and manufacturing; sea-shore to fishing, boat-building, commerce, etc.

VI.

Map of township. Mold first; then record upon paper. (1) general description; (2) boundaries; (3) the location of hills (or mountains), rivers and canals, railroads, cities and villages.

VII.

Map of county. Proceed as above under point VI. Later, maps of state and continent.

In all map-making, keep in view constantly the aim to give faithfully, surface, distance, direction. Emphasize each line used. Let the teacher take a picture of some unknown place and construct a map showing proper relations of the objects pictured; then pupils may construct other maps from pictures. This exercise aids greatly in the comprehension of maps. Teach them to read maps, explaining the use of color, of shading, of contour lines, of parallels, etc., etc.—*Com. of Ten, p. 221.*

Progressive maps are helpful in strengthening the memory during this and the fourth year.

VIII.

Observation work. Lessons on heat, cold, air, and movements of air, changes of weather, changes in shadow lengths, etc. Later, lessons on steam, fog, cloud, mist, rain, snow, hail, dew and frost. Find where each is found, how each is formed and how one form can be converted into another.

IX.

Lessons on soils: loam, clay, sand, gravel, and rock. Collect specimens of different soils. Object lessons on common minerals, so that they can readily be distinguished. These lessons call for much field-work.

X.

Lessons on common articles of food, and also on common articles of clothing.

The first twenty pages of Frye's Primary Geography deal briefly with the subject matter of this year's work. The teacher should supplement this text, to a large extent, with similar work.

The greatest care should be given to the oral and written exercises in these grades. Never allow a single mistake in writing to go uncorrected. It is time saved in the end, for the habit of accuracy gained in lower grades results in a great saving of time and power thruout the school course.

Encourage in pupils the idea of discovery; a fact discovered for himself becomes a part of a child's being and of infinite value.

## Fourth Year.

A more systematic study of geography is now undertaken using a text-book. This may have been taken up in the third year as recommended by the Committee of Ten. Redway's Natural Elementary Geography is good for this grade; also Frye's Primary from page 20. Redway holds man as the central idea in his text; Frye emphasizes relief of the earth and child-life. These texts cover about the same grade work, the third, fourth and fifth years. Consult these texts for systematic treatment of topics suitable for this grade.

The work now becomes the gaining of a general survey of the earth—a globe-conception; an application of elementary principles, hitherto gained, to new regions and an examination of the descriptive text to ascertain whether these conclusions are correctly drawn.

If found correct in his judgments, the pupil gains confidence in self and in methods of study; and he desires to study other lands even more in detail. Commercial relations furnish an interesting link between the child and the foreign land. Questions that seek to explain the interrelation of men and countries at once interest and lead to other questions.

If the home locality has been studied carefully the pupils should be able now to apply his first notions to the foreign lands, to compare these with his own, noting first, likenesses, then differences in position, in direction and amount of slope, etc., etc. He should observe, generalize, and then prophesy what might be expected to exist in the new land. A study of the text and collateral reading follows for proof of the correctness of his conclusions. "This boys of nine should be able to do and have done, when rightly instructed" says Prof. R. E. Dodge, of the Teachers College, New York City. He declares, "We should aim in the first, second and third years of our geography work so to combine what is commonly known as nature-study with the elementary principles of geography as to give the child an interested love for the world about him and to give him the fundamental facts so related that he can develop therefrom by a process of reasoning the simpler underlying principles of geography". "By the latter part of the third and surely thruout the fourth year the child should be able to go from a study of his home locality to a study of the other parts of the world, thru a process of reasoning the exact opposite of that followed hitherto in his work".—*Journal of School Geography January, 1897.*

Appeal should be constantly made to the pupil's own experience by questions, etc. Children are slow in perceiving relations and we must be careful about forcing relations of objects upon them. Generalizations should be demanded only after the facts have been acquired for their formation. We must aim to make the child think. "We cannot arbitrarily lead him up to a principle, which we have worked out for ourselves, and make him accept it. We must make him see the reasons on which we have founded the principle. Then he will accept it and will, later, learn to apply it".—*Richard E. Dodge.*

There are other problems than those in arithmetic, and when the pupil is brought face to face with a difficulty, he should not be loaded with explanations but he should be allowed to work out his own answers. Time is nothing when power is growing. It is a wise teacher who knows the right time to let a pupil alone, when working out an answer. Education is generation of power and the generation of power in the natural way is the very highest economy possible.

### Fifth Grade

This year should see the completion of the elementary text book. In this grade meteorology is still taught observationally, but the practice of recording carefully all facts observed, should be strictly insisted upon.

### Sixth Year to Close of Seventh Year.

These years are to be devoted to a review of the world, involving a study of all the continents more in detail. Here must be a profounder study of general principles. It now becomes a more intensive than extensive study.

Alex. Frye thinks that at the close of the grammar grade, pupils should know:

1. Continental slopes and basins; outlines of continents.
2. Heat-belts by latitude and elevation
3. Belts of winds: westerlies, trades, monsoons, etc.
4. General distribution of rain.
5. Divisions of earth's surface; fertile and barren areas, etc,
6. Natural flora and fauna; mining districts, etc.
7. Races of men (general location).
8. Fifty world centers of trade: principal capitals and historical cities.
9. Location of countries.
10. Proper use of atlas, gazetteer; and a taste for good books of travel.

Meteorology is now studied by means of topographical maps, pressure and wind charts, isothermal charts, and many others, showing annual rainfall, distribution of rain etc.

## 15. SUPPLEMENTARY WORK IN THE UPPER GRADES.

Every text-book on geography presents merely an outline, which is to guide teacher and class in a logical study of the earth. The teacher, who simply demands of his pupils the studying and reciting of the facts given in the paragraphs of an assigned lesson, is neither a true student of geography nor likely to arouse geographical interest in his pupils.

It has been said, that he who would teach effectively must possess a fund of knowledge ten times more comprehensive than that which he expects any of his pupils to gain thru him. It is surely true that the successful teacher must be able from his own intimate acquaintance with his subject to treat the day's lesson in many effective ways and to suggest readily many modes of study to his pupils of widely differing abilities.

Before the skeleton shall become a living glorious reality, the child must learn that the facts presented in the text are simply clues to multitudes of other facts, behind which lie the great truths of nature and of life, things he needs to make his own. The earlier he learns to search for the significance of each fact, the richer will become all future study.

The teacher must introduce therefore, wherever practicable, supplementary matter, whose function may be to explain and illustrate the assigned lesson, to test the pupil's understanding of the text, or to fix more permanently in mind the most important portions of each lesson. This outside work may often take the form of explanatory matter to be searched for in various reference books and reported upon later; of a written analysis of the lesson topics; of enlargements of certain portions of the text; or of schemes or tables showing the relations existing between various parts of the subject under consideration. Pupils should be frequently required to throw into outline form the salient points of each lesson; to draw up comparative tables on many related topics, as rivers and glaciers, waves and tides etc.; to illustrate paragraphs by original diagrams; to draft profile maps, lying in different directions across relief maps, so as to illustrate special topographic features. Pupils should be taught to read the pictures that more than adorn our present texts, and to construct maps showing the relative positions of all objects depicted. In Germany pictures are studied quite as much as the text and one of their pedagogical maxims, "The picture speaks more eloquently than any description we can hear or read" is no-where more frequently applied than in geography teaching.

Pupils often need a little help in finding the right methods of study. If they are little inclined to think, study with them for a short time. Alex Frye gives the following methods as likely to assist in training pupils to think for themselves.

1st. Method. Read paragraph by paragraph; require pupils to give in their own words the thots in oral and written form.

2nd. Method. Read single paragraphs. Call for questions on the sub-

ject matter read, pupils interrogating others sometimes. Allow discussion. This method is often helpful to backward pupils, who may ask very good questions. These should be written, for ease in giving and for fixing the fact in mind. Let no important fact pass unnoticed. The lesson may then be reproduced from memory.

3rd. Method. Write a list of topics upon the board and let the pupil recite from this. Let others question in recitation. The best mental growth is not so much in the study of the lesson as in the contact of mind with mind in recitation.

4th. Method. Study lesson, searching for questions likely to be asked. Let pupils express the answers in their own words. This is more difficult but it is the way one must study later in life.

5th. Method. Learn to make a list of topics in the mind. From this list write the substance of each topic. Collect papers and redistribute to other pupils for supplementary facts.

## 16. SUGGESTIONS ON CONDUCT OF THE RECITATION.

"All geography work has two phases; (1) descriptive or distributive, and (2) rational or scientific. As long as a teacher's questions all begin with 'What" or "Where" he may be doing good and necessary work, but it is in the purely descriptive phase, an exercise of memory largely and a getting of information. When he proceeds to ask "how" or "why" his teaching passes into the scientific phase and he is calling upon his pupils for the exercise of judgment and reason, and they are acquiring wisdom and power. To know scientifically is to know causally, to know the reasons for things."—*Chas. R. Dryer*, in Inland Educator.

"The teacher of geography, who has learned the art of asking sensible spontaneous live questions in the recitation room has gained more of the true method to be followed in such work than any amount of tutoring can give".

"The success of the geography lesson depends more upon the quality and order of the questions than upon any one factor".—*Jour. of School Geog. Sept. 1897.*

Hence lessons should be planned carefully and the questions chosen, that will develop the subject logically. All the questions in the lesson plan may not be asked in the class, but every question asked will be better and more to the point for the previous exercise. Many new questions must be asked, for, if those first asked arouse thot, the answers will show individualty and suggest other questions calculated to bring out the ideas of the class.

The questions should appeal to something in the pupil's own experience, stimulating observing faculties and offering opportunity for all, dull and bright, to contribute some item that is their own. An element of pleasure is added to the work, when the pupil finds that an advantage is gained from his common every-day experience.

All questions should be clear, definite and concise, and expsessed in language easily comprehended by the individual questioned. Of course the following classes of questions must be avoided here as every where in school life: (1) those which are unnecessary because illogical or too simple; (2) those conveying an idea of the answer desired; (3) those that demand a simple "yes" or "no" in reply: (4) those that are too comprehensive to be readily grasped; (5) those that are in any way obscure or incomplete.

In the development of the lesson, few questions are needed generally in the first step, preparation; in the application they are needed for several reasons; (1) to test the pupil's knowledge; (2) to arouse thot; (3) to lead the thot into unknown fields. But there should not be too much cross-firing of questions.

Let class work move on earnestly; press it judiciously. It must be thoro work, to be of any great value and at times a subject may be developed to show its far reaching relations. But avoid dawdling and dwelling upon trivialities, which is not thoroness.

Allow no lesson to be given by rote; it is thoroly bad for the teacher and worse for the pupils, for it begets an idle teacher and unthinking pupils, whose weakness becomes thus more weak.

Aim constantly to secure topical recitations. "Tell me all you can about this subject" is the only request needed. Since the mind is growing, we must not expect always finished products in recitation but we should expect to see signs of progress.

Train pupils:

(1) To narrate facts in their own language.

(2) To make and criticise definitions.

(3) To pass judgment upon their own and others recitations.

(4) To illustrate their own ideas, on blackboard and on paper.

(5) To learn how "to think upon their feet".

(6) To maintain the position of attention thruout the recitation.

Let the teacher remember continually that activity and curiosity are not to be repressed but enlisted as allies; that one fact is to be fixed by so grouping about it others related to it that it shall impress the mind vividly and excite and hold the interest; that the rational element must be introduced constantly into the work. This is not only really the easiest method of procedure but facts studied apart from their causes, are meaningless. The origin of temperament, diversity, personality and even of genius lies hidden in the deeper significance of geography.—*Dr. Trotter's thot, p. 59.*

Keep constantly before you a definite goal, the gaining of a thoro comprehension of a map (Geikie's idea) or something equally good.

Never tell pupils facts that they can find for themselves. We must help to create a demand for a wider information and then show the pupils how they can meet that demand themselves.

Frye says "Direct your energy to the greatest fault" and in the matter of reading all papers handed in by higher grades he thinks that one should read

a few, call attention to their mistakes and hundreds of others will be sooner or later outgrown. Glance at work apt to be carelessly done and require its re-writing if necessary.

A teacher with brains will increase brains. Col. Parker says "every brain is more or less idiotic". A half brained person will succeed moderately well, if strict routine work is demanded, but that is not teaching.

Teaching is not mere word learning; it is a thot-getting process that shall train the pupil in getting thots from nature and men, and from books, their natural products. A recent writer on educational topics has said "A hasty clutching of many things is easier and pleasanter to both teacher and pupil than a thoro mastering of one thing, but the child who has really conquered one subject is he who in manhood will win the knowledge of a thousand." It is not so much what we teach as how we teach.

But, if we find that strict routine work is weakening, then the methods of others, however good and sound if blindly followed, must bring disaster. We must not be imitators but investigators, thinkers, adapters, true teachers. There can be no such thing as a universal "right way" in methods; there are only great universal truths underlying all methods, and, if we grasp and hold these, applying them intelligently to the subject at hand, we will learn to adapt ourselves instantly to the changing conditions in the class room, and will find that the best method for that day lies in the impromptu treatment begotten at the moment to meet a real need.

## Conclusion.

"No matter how excellent the method it depends upon the teacher wholly to make it effective," says one educator who places methods secondary to the culture and ability of the teacher. A teacher interested, in earnest, and full of a subject can by thot and tact find a way to impart instruction in an effective manner.

True success in this work as in any other, is commensurate with the amount of preparation, originality, sincerity, self-sacrifice and love of truth brought to it by the teacher. We must seek first a thoro preparation. "A teacher" says W. M. Davis, of Harvard, "should strive to be able to explain and illustrate every statement of the text-book; to explain and comment upon all the more important passages by narration and example".

"The getting ready to teach geography is the work of a life-time and furnishes the common school teacher opportunity for the most liberal self-culture."—*Prof. E. C. Branson, of Georgia.*

The following thots from Dr. Spencer Trotter are of worth. Individual experience is the best indicator of methods. Learn all it can teach you. Read widely. Look for the significance of facts, Never lose sight of cause and effect. The true spirit of culture and education lies not in the amount of knowledge acquired but in the attitude of thot toward a subject. Cultivate this attitude of earnest investigation.

Since no books or methods can take the place of direct contact with

objects, come in contact with the great living world. Be alive to all impressions that come from the great world of humanity, and from nature. We must see and feel each fact, know it, grasp its meaning and realize its wonderful fitness for its office. In travel and thot, enter into the life of others.

Be yourself—dare to think, plan and act as your better judgment dictates. Be what you wish the pupil to be, awake, attentive, interested earnest, thotful and progressive.

Be honest and sincere. Learn to say "I do not know" but add "I will try to find out", when it may be necessary, that the pupil may catch the same spirit. If you should have known it, it is wisest to frankly admit it and do your best to find the desired answer. If you can answer his question, do so, even if he may not always understand the answer. It will show him the need of growth. The teacher, who pretends to know more than he does is a failure. Love of truth is fundamental to all true progress in science.

Be unselfish—Self is always the enemy of success. Shakespere says "Think of yourself last", and Phillip Brooks, "Efface yourself, if you would have your work stand". True success in any branch of teaching demands self-consecration. Are the pupils inattentive and unappreciative? Still give of yourself. They are worthy of your best, which is given not to what they now are, but to the men and women that they shall be. They deserve more than a knowledge of geography; they need an insight into life. A writer has said "Never give less than your best—and remember that your best is always yourself". Goethe says those who give most get most—only another version of the Bible truth.

Be searching ever for new truths. Col. F. W. Parker says "There is but one thing to educate, and that is motive, and the strongest of all motives is the divine tendency in the human soul to give oneself to others".

To do this, study yourself, your pupil and your subject till you know some of the truth.

Make the truths underlying all right methods your own, and then let truth and nature lead you.

Teach with the unwavering aim that geography shall give the pupil a better, nobler, truer view of the world, of life and of his own moral worth.

Then shall come to you a true method that shall make you free, indeed, and shall give to your pupils a still wider freedom, their rightful heritage.

# Guiding Principles in Nature Study.

Dr. E. G. Howe gives as the basts of a long and successful experience in elementary science work the following principles:

1. A child can be lead to any height, if the steps are made short enough.

2. The mental powers must have *exercise* to grow.

3. The senses are capable of cultivation and will then increase our "correspondences".

4. The mind derives its ideas from the perceptions of the sence.

5. Ideas (i. e. suggestions) will manifest themselves in corresponding words and actions, or as "seed-thoughts" develop into new and original discoveries and inventions.

6. Feeding—Childhood is the time to grow and fill up, in this stage the child should see and handle.

7. *Assimilation*—In youth the more mature brain is able to act upon the gathered material of childhood, systematize, correlate, reason and deduce. Pupils should be guided to *experiment* and *observation*.

8. Reproduction—Maturity (as to its character) will be largely based on the resultants of:

(*a*) the accumulations of the child;

(*c*) the deductions of the youth.

Pupils should now be led to subjects involving *generalizations*.

9. The value of first impressions is so great, that every care should be exercised tc make them clear and accurate.

10. To be fixed, impressions must be repeated.

11. Things must be seen frcm different stand-points and in varied relations. Let the repeating involve this and be a new view as well as a review.

12. No subject is so profound but its central truths can be taught to very small children.

13. These "central truths" will become "seed thoughts" developing naturally with the child's growth and serving as centers of attraction for related facts.

14. Work from the *simplest*, the *general*— and that within the child's experience—to the *complex*, *particular* and unknown or *unobserved*.

15. Tell nothing, which can be taught in any other way. Do nothing for the child that he can do for himself.

Hence in the study of nature outlined in Dr. Howe's system, he endeavors to:

(1) Get the child to see and handle a wisely chosen and comprehensive series of stones, plants and animals.

(2) Lead to closer observation and thus increase his acquaintance.

(3) Cultivate the powers of decision and still further widen the range of his acquaintance.

(4) Systematize and observe the relation of things to each other.

COORDINATE WITH "DR. E. G. HOWE", ETC.

Hints to be observed in giving the lesson:

(1) "Have a reason clearly in mind for giving every lesson. *Seek for this in the relation of the subject to the child.*

(2) Have a reason clearly in mind for the way in which the lesson is presented. *Seek for this in the study of the laws which govern the growth of the child.*

(3) Plan only for such work as the pupils can do for themselves, or, at least, take the leading part in doing.

(4) Place the child directly in contact with nature *under normal conditions.*

(5) Begin with something which is really a part of the pupil's experience—*not with something* which you have to tell.

(6) Accept, as good, only such results as indicate honesty of purpose growth of mind.

(7) Be faithful and bide your time".

—*Dean W. S. Jackman, (University of Chicago) in "Nature Study" p. 28. Systematic Science Teaching, pp. 1-2.*

A study of the child's spontaneities teaches us that we must study with him things of life and action; things that he loves naturally; that we must not repress thotlessly his outgoing of sympathy for all created things. We must remember his love for creating and must, therefore, train his riotous imagination, not repress it, for it is to be of untold value later.

We should aim to secure within walls the same freedom and interest that he feels outside of school walls.

We must be very slow in condemming a child's way of investigating. Follow his lead rather, so long as he is working out an idea, however crude. Our system of education may have misled us and we often need to return to nature's true way and learn from the little child.

We must avoid early specialization, as it tends to narrow the child's first ideas of each great science.

We must not expect too large results from each day's work in the lower grades.

We must teach the pupil to seek for facts first, but only as clues to truths, which are eternal.

We must be sure to teach the child to question old mother Nature and to wait for her answers. This takes time but the child always has time to receive right impressions. "He has all the time there is". Hurry is always fatal in Nature Study. Froebel tells us that we should not always answer the

child's question at once and directly but *as soon as he has gathered sufficient strength and experience* furnish him with the means to find out the answers.

Dr. Clifton F. Hodge says "The very breath of life for a healthy vigorous child is original investigation; and to stuff the memory faster than the power to think and the will to do are developed, is the quickest road to mental indolence. * * Every question is a prize, a living, bursting bud; be careful of it. Make the most and the best of it. If the children are really doing something, there will be no end of questions with real purpose in them". The teacher *must not tell what he knows*; he must lead the child to that point where he can find out for himself. If the question is one that no one knows anything about leave it with them for the coming of the answer, for our public education should develop in the pupil what he needs most, Individual initiative, power to think and do—resource. "If the question is too hard to answer in a day or a week or a year, so much the better. If it be one worth while to work at for a lifetime, so much the better. You may have given a life work, the highest prize a teacher can ever give a pupil".—*Dr. C. F. Hodge, in Nature Study and Life. pp 143-144.*

## Course of Study.

Many educators recommend a spiral course, treating in each cycle, more or less of the four principal aspects of nature. This spiral ascends from the lowest grade in the primary school to the close of the high school, having regard to the after work of the colleges. Such a course shows the natural inter-dependences of the natural sciences.

Dr. Howe's course is such a spiral, treating in each cycle, in varying order: first, Stars and Earth; second, Minerals and Rocks; third, Plants; fourth, Animals; adapted in each cycle to more advanced pupils.

Plants are studied first and are taken up every fall term, and in certain years, they are studied also in the spring weeks.

Animals are also reserved for spring and fall work.

Minerals and Rocks occupy a part of the winter months leaving others for the study of Earth and Sky.

There are many admirable points in Dr. Howe's system and it has stood successfully the tests of nearly twenty years.

Every year's work develops the imaginative faculties and encourages conversation concerning all objects seen or handled—stimulates and promotes a love for reading and develops self-control in care of specimens, (especially those in form of fruit) in care of minerals, in kindness to animals, in neatness of notes and drawings. It calls for character-study in animals and in children, honesty in care of specimens, exactness and thoroness in experimenting. It brings about an unfolding of great subjects; a revelation of the wonderful and sublime in nature and then leads to the power and wisdom of the Creator and the majesty and brotherhood of man. It results in a growing reverence and love for Him who creates and keeps his handiwork in marvellous ways.

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